

The butterflies of Jordan

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Abstract. A total of 63 species of butterflies are recorded from the different ecological zones in Jordan as a result of the examination of more than 3350 specimens in the collection of the University of Jordan Insects Museum and the Natural History Museum at Yarmouk University. These specimens were collected from different parts of Jordan from 1974 to 1999. *Colotis danae* and *Anthocharis gruneri* (Pieridae) are recorded for the first time. Collecting sites, seasonal occurrence and available biological or ecological notes are given for each species. An updated list of the butterflies of Jordan is given based on this study and previous records, bringing the total to 91 species and subspecies.

Keywords: Butterflies, Rhopalocera, Jordan.

INTRODUCTION

The butterflies of Jordan have been studied since the beginning of this century. Graves (1925) studied the collection acquired by Mr. Philby while serving in Jordan. Hemming (1932) gave the first comprehensive study on the Jordanian butterflies. A series of papers were published by Larsen (1975, 1976, 1977, 1984 a, b) about the butterflies of Jordan and nearby areas. Al Musa (1979) listed 40 species of butterflies and 69 species of moths from Jordan. However, the comprehensive study of Larsen & Nakamura (1983) is still our main reference, which was based on several collections either housed in Jordan or abroad. Bozano (1990) recorded 52 species based on two visits to the country in the spring of 1989. Ten Hagen (1995, 1996) reported on the butterflies of Syria and Jordan. Amr et al. (1997) reported on 11 species from Al Azraq Reserve in the eastern desert. Fabiano (1998) conducted several visits to the southern desert of Jordan in the spring months of

1992 to 1996 and recorded 35 species.

Jordan is the southernmost outpost of many Palaearctic species and a northern frontier for several tropical and eremic butterflies (Larsen & Nakamura, 1983). Although Jordan is a small country, the presence of several phytogeographical zones makes the Jordanian butterfly fauna interesting. However, Jordan has undergone drastic ecological changes in the form of agricultural development coupled with extensive use of pesticides, urbanization and destruction of natural habitats, which certainly affected species composition and distribution of the butterflies of Jordan.

The aim of this paper is to present an update on the butterflies of Jordan based on the examination of a large series of butterflies housed in the University of Jordan Insects Museum, the Natural History Museum at Yarmouk University, and on records in previous literature. We also included our field observations during field trips conducted in different parts of Jordan during the last several years.

MATERIALS AND METHODS

Butterfly collecting in all biotopes of Jordan was conducted from 1993 to 1999. In addition, specimens housed at the University of Jordan Insects Museum and the Jordan Natural History Museum, Yarmouk University were examined. We studied also a small collection from the newly established Al Mujib Nature Reserve, which was collected by Paul Hendig, a volunteer with the American Peace Corps working with the Royal Society for the Conservation of Nature. Common names given at the remarks section follow Higgins & Riley (1970), Larsen (1983) and Walker & Pittaway (1987). The geographic names for localities are arranged alphabetically and follow the Gazetteer of Jordan (Anon 1990). Data about global distribution, previous records, phytogeographical zones, and hosts of species follow mainly Larsen & Nakamura (1983). The number of specimens examined is given for each species. Numbers of specimens collected in each month is presented between brackets in order to give an approximate idea about the seasonal occurrence.

We have downgraded two subspecies in accordance with the recent review of Turkish butterflies by Hesselbarth et al. (1995); these changes are endorsed by Larsen (pers. comm.).

RESULTS

Papilionidae

Papilioninae

Papilio machaon syriacus Verity, 1905

Material. 41 specimens. *Localities.* Al Aridah road, Al Hammah, Al Jubayhah, Ar Rusayfah, As Salt, Ghawr Kabid, Jarash, Ma'in, Natifah, Na'ur, Wadi al Arab, Zayy.

Collecting months. MAR (3), APR (12), MAY (10), JUN (4), JUL (4), AUG (0), SEP (0), OCT (5), NOV (3).

Remarks. The Swallowtail is a Holarctic species with a wide range of distribution, but the subspecies *syriacus* is confined to the Levant and eastern Saudi Arabia (Pittaway et al. 1994). In Jordan, it occurs in the northern and southern Mediterranean zones and in the Jordan Valley. Larsen & Nakamura (1983) reported specimens as far south as Ras el Naqb. Collecting months suggests two broods, one

in early March and extends to May, followed by another in October. Larvae feed on several species of the families Apiaceae and Rutaceae. This beautiful butterfly is not common and its collection by the locals as an ornamental item may affect its population.

Papilio alexanor maccabaicus Staudinger, 1891

Material. 2 specimens. *Locality.* Al Jubayhah.

Collecting months. MAR (1), APR (1).

Remarks. The Tiger Swallowtail occurs in southern France, Italy, the Balkans, Asia Minor, Iran, Iraq, Turkestan, Afghanistan and north-western India. It is a rare species found in the northern Mediterranean zone of Jordan. Previously collected from Wadi Kufringi and Wadi Zarqa (Larsen & Nakamura 1983). Ten Hagen (1995) collected it from Na'ur. Al-Jubayhah represents the 4th locality for this rare species. Nakamura & Ae (1977) gave a comprehensive account on its biology, in which they indicated that peak activity occurs during April.

Zerynthiinae

Allancastria deyrollei eisneri Bernardi, 1971

Material. 37 specimens. *Localities.* Al Aridah, Al Jubayhah, Amman, Ar Rumman, As Salt, Ash Shajarah, Ayn Abdah, Ayn Aqraba, Ghawr Kabid, Jarash, Madaba, Mahis, Sakib, Wadi Shu'ayb.

Collecting months. MAR (8), APR (25), MAY (4).

Remarks. The Lebanese Festoon is found in Turkey and the Levant. It is confined to the Mediterranean regions of Jordan, and less frequent in the Jordan Valley. Previously collected as far south as Petra in southern Jordan by Lockhart (Larsen & Nakamura 1983). Peak activity occurs during April in a single brood and declines thereafter. This species is associated with the Moorish Birthwort, *Aristolochia maurorum*, a mountainous plant of the family Aristolochiaceae. *Allancastria cerisyi speciosa* Stichel occurs in coastal areas of Palestine and Lebanon, but it appears that it can not penetrate into Jordan (Larsen & Nakamura 1983).

Parnassiinae

Archon apollinus Herbst, 1798

Material. 103 specimens. *Localities.* Al Bunayyat, Al Ghawr, Al Jubayhah, Al Kufrayn, Al Muqabalayn, Amman, As Salt, Ash Shajarah, At Turrah, Ayn

Abdah, Dibbin, Ghawr Kabid, Irbid, Jarash, Madaba, Umm Qays, Yarqa.

Collecting months. FEB (2), MAR (52), APR (43), MAY (4), JUN (1), JUL (0), AUG (1).

Remarks. The False Apollo is a Pontomediterranean butterfly, limited to Bulgaria, Turkey, the Levant and Iraq. It is found in the Mediterranean zones and the Jordan Valley. Collecting months suggests one brood annually that occurs in March and April. Similar to *A. d. eisneri*, larvae prefer the Moorish Birthwort as a food source.

Pieridae

Pierinae

Aporia crataegi augustior Graves, 1925

Material. 96 specimens. *Localities.* Al Bunayyat, Al Fuhays, Al Jubayhah, Al Muqabalayn, Amman, Ar Rumman, As Salt, Jarash, Kufrinigah, Mursi, Northern Jordan Valley, Shunat Nimrin, Tila' al Ali, Umm kharrubah.

Collecting months. FEB (1), MAR (0), APR (85), MAY (10).

Remarks. The Black-veined White is widely distributed in the Palaearctic region. In Jordan, it is common in the mountainous areas and along the Jordan Valley. Peak activity occurs in April. Larsen (1977) reported on the seasonal fluctuation of this butterfly, and indicated that it becomes very scarce and later reappear in relatively high numbers. He reported that this phenomenon is known among populations occurring at the limit of its distribution. Larvae feed on *Crataegus*, *Prunus duleis* (Almond) and other Rosaceae where they may become pests.

Pieris brassicae Linnaeus, 1758

Material. 69 specimens. *Localities.* Al Hashimiyah, Al Jubayhah, Al Yadudah, Amman, As salt, Az Zarqa', Irbid, Jordan Valley, Madaba, Mashari', Sahab, Suwaylih, Wadi as Sir, Wadi Shu'ayb, Zayy.

Collecting months. FEB (18), MAR (8), APR (10), MAY (3), JUN (2), JUL (1), AUG (15), SEP (4), OCT (7), NOV (1).

Remarks. The Large White is found from North Africa via most of Europe and the Middle East to the Himalayas. It occurs in Chile and South Africa as an introduction. It is a migrant species common in the Mediterranean zones of Jordan from which it penetrates the Jordan Valley. Its presence

throughout of the year suggests that it have several broods. It feeds on several species of family Brassicaceae and *Capparis spinosa* (Capparidaceae). The subspecies *atalaueca* was believed to be an east Mediterranean subspecies is considered an ecological form.

Pieris rapae leucosoma Schawerda, 1905

Material. 202 specimens. *Localities.* Ajlun, Al Aridah, Al Baq'ah, Al Fuhays, Al Ghawr, Al Jubayhah, Al Kufrayn, Al Kirbah As Samrah, Al Mujib Nature Reserve, Al Mushqqar, Al Muwaqqar, Amman, As Salt, As Simakiyah, As Sukhnah, Az Zarqa, Dayr Alla, Dhulayl, Huwayrah, Irbid, Jarash, Kurayyimah, Madaba, Mahis, North Shunah, Suwaylih, Tila' al Ali, Umm Qays, Wadi Shu'ayb, Yajuz.

Collecting months. JAN (5), FEB (8), MAR (30), APR (44), MAY (12), JUN (15), JUL (8), AUG (7), SEP (13), OCT (34), NOV (24), DEC (2).

Remarks. The Small White is a migratory butterfly found throughout the Palaearctic region and as an introduction in North America, Australia and New Zealand. The subspecies *leucosoma* is mostly associated with the Mediterranean ecozone and the Jordan Valley. It was collected all-year round, and populations in the Jordan valley have several broods. Butterflies were observed in remote areas as Qasr Burqu' in the eastern desert as well as in the busy streets downtown in Amman. Amr et al. (1997) reported that it was one of the most common species found in Al Azraq Reserve.

Pontia edusa Fabricius, 1777

Material. 208 specimens. *Localities.* Abu Alandah, Ajlun, Al Aridah, Al Dhulayl Station, Al Fuhays, Al Ghawr, Al Hammah, Al Jubayhah, Al Mujib Nature Reserve, Al Mushaqqar, Al Wala, Al Lajjun, Amman, Ash Shawbak, As Salt, As Simakiyah, At Turrah, Ayn Qantara, Ayn at Turab, Az Zarqa', Bayt Yafa, Dayr Alla, Ghawr Kabid, Irbid, Jarash road, King Talal Dam, Kufrinijah, Mughaiyyir (Essirhan?), North Shunah, Rasun, Sadd el khaledyeh, Sakib, Shafa Badran, Suwaylih, Tabarbawr, Tila' al Ali, Umm Qays, Umm Kharrubah, Wadi al Arab, Wadi al Yabis, Waqqas, Zayy.

Collecting months: JAN (2), FEB (7), MAR (7), APR (24), MAY (31), JUN (21), JUL (14), AUG (27), SEP (27), OCT (20), NOV (24), DEC (4).

Remarks. The Eastern Bath White occurs in the Sahara, most of Europe, India, Central Asia and east

Asia. It is one of the most common species inhabiting almost all parts of Jordan except the southern desert. It mainly feeds on a species of the genus *Reseda* (Larsen & Nakamura 1983). In Iraq, larvae attack mustard and other Brassicaceae (Al Hussein 1984). Amr et al. (1997) found it associated with areas of *Tamarix* and *Alhaji maurorum* in Al Azraq Reserve.

***Pontia glauconome glauconome* Klug, 1829**

Material. 2 specimens. *Locality.* Al Mujib Nature Reserve.

Collecting month. MAY (2).

Remarks. The Desert White is an eremic species found in North Africa, Arabian and Middle Eastern deserts. It occurs in the southern Jordan Valley, northern and southern deserts of Jordan. It is very scarce. It was collected from March to May. The pupa can diapause for several years. Larvae feed on *Zilla spinosa* L. (Brassicaceae) and *Ochradenus baccatus* Del. (Resedaceae). Amr et al. (1997) mentioned that it was a rare species in Al Azraq Reserve.

***Madais fausta fausta* Olivier, 1804**

Material. 167 specimens. *Localities.* Al A'al, Al Baqurah, Al Jubayhah, Al Mujib Nature Reserve, Amman, As Salt, Ayn al Bayda, Ayn at Turab, Az Zarqa', Dayr Alla, Ghawr As Safi, Irbid, Kharjah, Kufrinijah, Ma'in, Near Dead sea, North al Adasiyah, Rahub, Sadd al Khaldeyyeh, Shunat Nimrin, Wadi Shu'ayb, Wadi ar Rayyah, Zayy.

Collecting months. APR (2), MAY (0), JUN (3), JUL (5), AUG (91), SEP (35), OCT (21), NOV (9), DEC (1),

Remarks. This subspecies is found in north-western Egypt, the Middle East, the Arabian Peninsula, Iraq and south-western Iran. The Salmon Capar butterfly is a rather migratory species with a distribution confined to the Jordan Valley and the upper Mediterranean zone. Other earlier localities include Zarqa Main and Petra (Larsen & Nakamura, 1983). It seems that it has two broods, one in spring and another towards the end of July. Larsen (1975) suggested that a regular migratory contact with the Arabian populations occurs to ensure the survival of the Jordanian populations.

***Colotis phisadia phisadia* Godart, 1819**

Material. 4 specimens. *Localities.* Ghor as Safi, Ghor Khunceizierel.

Collecting months. MAR (3), DEC (1)

Remarks. The Blue Spotted Arab is common in tropical Africa, Arabia and Jordan. It is limited to the Dead Sea area in Jordan but it is possible to have contacts with the Arabian populations through Wadi Arabah and Aqaba. It is a tropical element of the Jordanian fauna. The larval food plant is *Salvadora persica*.

***Colotis danae eupompe* Klug, 1829**

Material. 1 specimen. *Locality.* Mahis.

Collecting month. JUN (1).

Remarks. The Scarlet Tip is an Afrotropical butterfly being one of the most widespread butterflies in dry tropical Africa, but also occurs in India. Only one specimen is known from Egypt. It is common in southwestern Arabia and Dhofar. This species is recorded from Jordan for the first time and it is apparently very rare. The single specimen was collected on the 7th of June 1991. Larvae feed on *Cadaba* spp. and perhaps other Capparidaceae (Larsen 1990).

***Beletois aurota aurota* Fabricius, 1793**

Material. 22 specimens. *Localities.* Al Jubayhah, Al Mujib Nature Reserve, Amman, Ghawr Kabid, Ghawr as Safi, Nahlah, Shunat Nimrin, Wadi as Sir.

Collecting months. MAY (1), JUN (0), JUL (1), AUG (3), SEP (2), OCT (3), NOV (12).

Remarks. The Capar White is a strong tropical migrant butterfly. Larsen & Nakamura (1983) referred to several occasions citing the migratory behavior of this butterfly in Lebanon and Palestine. It prefers the warm Jordan Valley, however, it was collected from two localities within the eastern mountains. It feeds on *Capparis spinosa*.

***Euchloe ausonia melisande* Fruhstorfer, 1908**

Material. 50 specimens. *Localities.* Al Aridal, Al Jubayhah, Al Walah, Amman, As Salt, Dayr Abi Sa'ed, Dayr Alla, Gawr Kabid, Umm ar Rumman,

Collecting months. FEB (1), MAR (21), APR (25), MAY (2), OCT (1).

Remarks. The *E. ausonia* complex is found all around the Mediterranean and in Asia Minor. The Dappled White is common in both Mediterranean zones of Jordan. It feeds on *Brassica* and *Sinapis* (Brassicaceae).

***Euchloe belemia* Esper, 1799**

Material. 50 specimens. *Localities.* Al Jubayhah,

Al Aridah, Ash Shajarah, Ayn Abdah, Ayn Aqraba, Ayn Ghazal, Bayt Yafa, Dayr Alla, Ghawr Kabid, Irbid, Al Qarn, North Shunah, Qashab, Wadi al Arab, Wadi Shu'ayb.

Collecting months. FEB (7), MAR (20), APR (23).

Remarks. The Green-striped White extends from Iberian Peninsula, via North Africa to the Middle East and Iran to Baluchistan. In addition, it was recorded from Ethiopia and Arabia. It is a common species in the northern Mediterranean zone of Jordan and known to occur in the Jordan Valley. Apparently, it has one brood in the spring, with highest peak of emergence in April. It feeds on *Erucaria* in the Jordan Valley (Trought in Larsen & Nakamura 1983).

***Euchloe charltonia* Donzel, 1842**

Material. 5 specimens. *Localities.* Al Karak, Azraq, Ghawr Kabid, Al Quarn, Wadi al Arab.

Collecting months. MAR (3), APR (1), MAY (1).

Remarks. The Greenish Black-tip is an eremic butterfly, distributed from North Africa via the Middle East to Afghanistan. In Jordan, it is mostly associated with the Irano-Turanian ecozone, with fewer populations occurring in the Jordan Valley. Amr et al. (1997) reported on its rare presence in Al Azraq Reserve. Previous collecting dates suggest up to three broods per year. It feeds on several species of *Diplotaxis*, and Rough and Sweet Stock (*Matthiola* sp.). Ten Hagen (1996) recorded *Euchloe penia* Freyer 1851 from Syria. It is possible that this species may occur in north Jordan, however, this needs further investigation.

***Zegris eupheme urda* Hemming, 1929**

Material. 3 specimens. *Locality.* Wadi Al Walah.

Collecting month. MAR (3).

Remarks. The Sooty Orange Tip occurs in dry parts of Spain and Morocco, the Dead Sea area, the desert between Jordan and Iraq, parts of Turkey and Iran, to dry Central Asia. In Jordan, The subspecies *urda* is limited to the Irano-Turanian zone separating the Mediterranean vegetation from the lower parts of Jordan Valley. One brood appears from late February to early April. The larvae feed on *Erucaria boveana* in Palestine. Pittaway (1985) described *Zegris eupheme larseni* from Saudi Arabia and Jordan. One paratype female was collected from Wadi Rum (south Jordan) by Larsen in 1977. Photographs of both male and female are given by Larsen (1983),

Bozano (1990) and Fabiano (1998).

***Anthocharis gruneri gruneri* Herrich-Schäffer, 1851**

Material. 2 specimens. *Localities.* Ayn Aqrabah, Wadi As Salt.

Collecting months. FEB (1), MAR (1).

Remarks. The Grüner's Orange Tip is found in south Europe and Turkey (Higgins and Riley, 1970) and in Palestine (Larsen & Nakamura 1983). This species is recorded from Jordan for the first time. As Larsen & Nakamura predicted, this species is now recorded from the northern Mediterranean zone. The specimen from Ayn Aqraba was collected in 1993 while the other one in 1999.

***Anthocharis cardamines phoenissa* von Kalchberg, 1894**

Material. 9 specimens. *Localities.* Ayn Abdah, Ayn Aqraba, Wadi al Arab.

Collecting months. FEB (1), MAR (8)

Remarks. The Orange Tip is found from western Europe, temperate Asia to Japan. Larsen & Nakamura (1983) included this species based on Trevor Trought's field notes. Our specimens confirm the presence of this species in Jordan. The localities indicated above are within the most north western part of the northern Mediterranean zone. This species is quite common in Lebanon and Palestine.

Coliadinae

***Colias crocea crocea* Geoffroy, 1785**

Material. 227 specimens. *Localities.* Ajlun, Dhulayl, Al Azraq, Al Ghawr, Al Jubayhah, Al Karamah, Al Kurayyimah, Al Mafraq, Amman, Ar Rumaymin, As Salt, Ash Shawbak, Ayn Qantara, Dayr abu Sa'id, Dayr Alla, Dead Sea area, Ghawr as Safi, Ibbin, Irbid, Jarash, King Talal Dam, Madaba, Nahlah, Qasr Al Hallabat, Qwaylibah, Sahab, Shunah Nimrin, Tila' al Ali, Umm Qays, Wadi as Sir, Wadi al Arab, Wadi Shu'ayb, Zayy.

Collecting months. FEB (1), MAR (4), APR (21), MAY (21), JUN (21), JUL (44), AUG (6), SEP (14), OCT (78), NOV (12), DEC (5).

Remarks. The Clouded Yellow is common in North Africa, Europe and the Middle East. In Jordan, it is common throughout the Mediterranean and the Irano-Turanian zones. Collecting dates suggest that it has several broods that fly all-year round. It feeds on several species of *Vicia*. Amr et

al. (1997) found it common near cultivated alfalfa (*Medicago sativa*) in Al Azraq Reserve.

***Gonepteryx cleopatra taurica* Staudinger, 1881**

Material. 3 specimens. *Locality.* Ajlun.

Collecting month. MAY (3)

Remarks. The Cleopatra is a typical Holomediterranean species. Although Larsen & Nakamura (1983) gave several localities within the northern Mediterranean zone, we have one single locality in northern Jordan. This is a forest-adapted species. Decline in its numbers and distribution may reflect the degradation of forests in Jordan. The larval food plants are *Rhamnus* spp.

Nymphalidae

Danainae

***Danaus chrysippus chrysippus* Linnaeus, 1758**

Material. 99 specimens. *Localities.* Al Jubayhah, Al Karamah, Al Kufrayn, Al Mu'addi, Al Mujib Nature Reserve, As Salt, Azraq, Dayr Alla, Ghawr as Safi, Ghawr Kabid, Jarash, Jordan River (at Prince Mohamad farm, Waqqas, and Zoor Baurah).

Collecting months. JAN (9), FEB (0), MAR (0), APR (3), MAY (6), JUN (0), JUL (27), AUG (7), SEP (0), OCT (15), NOV (10), DEC (24).

Remarks. The Plain Tiger is a migrant butterfly widely distributed in the old world tropics. It is common in the Jordan Valley, however, few specimens were caught from Azraq in the Eastern Desert and the Mediterranean region as well. It was seen migrating northward by the Jordan River in 1996 at Al baqurah in the extreme north west of Jordan. The main food plant is *Calotropis procera*, but other Asclepiadaceae are acceptable.

Charaxinae

***Charaxes jasius jasius* Linnaeus 1767**

Material. 1 specimen. *Locality.* Rasun.

Collecting month. July (1).

Remarks. The Two-Tailed Pasha is the only Palaearctic off-shoot of the tropical genus, being local and uncommon species in the Middle East. It is a very rare species, only one specimen was collected from Rasun in the northern Mediterranean zone. The food plant is *Arbutus unedo*.

Nymphalinae

***Junonia orithya* here Lang, 1884**

Material. 1 specimen. *Locality.* Al Jubayhah.

Collecting month. MAY (1).

Remarks. The Blue Pansy is a tropical migrant but the subspecies *here* is found in Arabia (Larsen, 1990). Larsen caught one specimen in the autumn of 1983 (Larsen 1984b). Benyamini (1990) indicated its occurrence on the western side of the Jordan Valley north of the Dead Sea. It was seen feeding on tiny white flowers of *Heliotropium bacciferum* in Saudi Arabia.

***Limenitis reducta schiffermuelleri* Higgins, 1933**

Material. 5 specimens. *Locality.* Rasun.

Collecting months. MAY (3), JUN (0), JUL (2).

Remarks. The Southern White Admiral is found in southern and central Europe to Iran. It is a rare species in Jordan. Larsen & Nakamura (1983) mentioned that only two records of this species were known from Jordan (Dibbin and Jarash). Rasun represents a third locality. All of these localities are in the northern Mediterranean zone to which the species appears to be limited. It feeds on *Lonicera* sp.

***Vanessa atalanta* Linnaeus, 1758**

Material. 7 specimens. *Localities.* Ajlun, Al Jubayhah, Ghawr Kabid, As Salt, Tabarbawr.

Collecting months. APR (1), MAY (1), JUN (1), JUL (0), AUG (0), SEP (0), OCT (0), NOV (3), DEC (1).

Remarks. The Red Admiral is migrant species that occurs in the Holarctic region. It is a scarce species in Jordan, mostly recorded from the northern Mediterranean zone but may be found in the Jordan Valley. The food plant is *Parietaria* and *Urtica pilulifera*.

***Vanessa cardui cardui* Linnaeus, 1758**

Material. 198 specimens. *Localities.* Abu Alandah, Ajlun, Al Aridah, At Turrah, Al Jubayhah, Al Kufrayn, Al Lajjun, Al Mafrag, Al Muqabalayn, Al Muwaqqar, Amman, As Salt, Ash Shawbak, Az Zarka', Dayr Alla, Dead sea, Dhulayl, Dibbin, Ghawr Kabid, Irbid, Jarash, Juffayn, Khaww, King Talal Dam, Kufrayn, Mahis, Na'ur, Nahlah, Sadd al Khaldeyyah, Sahab, Shafa Badran, South Al Ghawr-Dead Sea, Ukaydir, Wadi al Arab, Wadi as Sir, Zayy, near the Zeizia.

Collecting months. JAN (7), FEB (4), MAR (30),

APR (69), MAY (28), JUN (13), JUL (7), AUG (7), SEP (0), OCT (12), NOV (19), DEC (2).

Remarks. The Painted Lady is a migrant butterfly distributed world-wide except most of South America. As the data indicate, it occurs in all parts of Jordan all months of the year. Larsen (1976) discussed its migration in the Middle East and emphasized the need for a more comprehensive data on its behavior. We observed large numbers migrating in north or north-western direction in February 1997 in Wadi Arabah and in the Jordan Valley. However, later in the season they were seen migrating in south or south-eastern direction. The butterflies fly very fast in open areas and very difficult to catch. But once they land on weeds in numbers they are easy to collect. They were so abundant that the wind shield of cars and radiators has to be washed after a short trip to the Jordan Valley. Amr et al. (1997) found this species to be common in Al Azraq Reserve. The normal food plants are species of *Carduus*, *Cynara*, *Arctium* and other Composites. Fabaceae and Brassicaceae are only used in crisis situations.

***Polygonia egea* Cramer, 1775**

Material. 13 specimens. *Localities.* Al Jubayhah, Al Fuhays, Amman, As Salt, Ghawr Kabid.

Collecting months. MAY (4), JUN (5), JUL (0), AUG (1), SEP (1), OCT (1), NOV (1).

Remarks. The Southern Comma is found along the Mediterranean coast from Provence to Greece, through Turkey and the Levant to Afghanistan. In Jordan, this butterfly occurs mainly in the northern Mediterranean zone but may be found also in the Jordan Valley (at Gawr Kabid). Ten Hagen (1995) recorded it as far south as Petra. It has two or three broods from March to November. The food plants are species *Parietaria*.

***Melitaea phoebe telona* Fruhstorfer, 1908**

Material. 61 specimens. *Localities.* Ajlun, Al Aridah, Al Bunayyat, Al Fuhays, Al Jubayhah, Al Mujib Nature Reserve, Al Quwasymah, Amman, As Salt, Athneebah, Ayn Abdah, Ayn Aqrabah, Ayn Qantarah, Az Zarqa, Dayr Alla, Jarash, Khalda, Suwaylih, Tila' al Ali, Ukaydir, Umm al Hyran, Umm ar Rumman, Wadi al Arab, Wadi Jarash, Zayy, Ziqlab.

Collecting months. FEB (1), MAR (3), APR (35), MAY (10), JUN (10), AUG (1), SEP (1).

Remarks. The Knapweed Fritillary occurs from

North Africa and Spain to Korea. It was thought to inhabit the Mediterranean zones only, however, Fabiano (1998) recorded specimens from the arid granite mountains (southern desert) overlooking the town of Aqaba. The first brood flies in April, a second brood may occur late in the year but apparently in low numbers. Larsen (1974) found it on *Centaurea calcitrapa*, *Carduus pycnocephalus* in Lebanon.

***Melitaea arduinna evanescens* Staudinger, 1886**

Material. 11 specimens. *Localities.* Al Quwasymah, Jarash, Shafa Badran, Tabarbawr, Umm ar Rumman.

Collecting months. MAR (5), APR (5), MAY (1).

Remarks. The Freyer's Fritillary is distributed from Bulgaria and Asia Minor to Iran and Central Asia. It was assumed that the subspecies *evanescens* is limited to As Salt area (Larsen & Nakamura 1983), however, we collected specimens from other areas like Jarash and Amman. Even though it was considered as a rare species, its numbers appear to be more than previously thought. A large number was observed flying in March at a sunny day in Tabarbour (Amman). Ten Hagen (1995) recorded this species from Na'ur. The closest populations of this butterfly are in Iraq and southern Turkey. The Jordanian populations may be a relict of a brief period in time when there was a wet Irano-Turanian bridge between Jordan and Iraq (Larsen & Nakamura 1983).

***Melitaea trivia syriaca* Rebel, 1905**

Material. 77 specimens. *Localities.* Ajlun, Ayn Qantara, Ayn Abdah, Ayn Aqraba, Bayt Yafa, Qu'aylibah, Ukaydir Wadi al Arab, Wadi Jarash, Ziqlab.

Collecting months. MAR (4), APR (43), MAY (15), JUN (13), JUL (0), AUG (0), SEP (0), OCT (2).

Remarks. The Mullein Fritillary occurs in hot parts of southern Europe through the Middle East to Baluchistan. In Jordan, it is common in the Mediterranean zones, Jordan Valley and fringes on eastern desert. Fabiano (1998) recorded specimens from the southern desert for the first time. Almost all of our records are in the northern Mediterranean zone. The data suggest a peak activity from April to June. The Larvae feed on *Verbascum* sp.

***Melitaea deserticola macromaculata* Belter, 1934**

Material. 17 specimens. *Localities.* Al Jubayhah,

Al Mujib Nature Reserve, Ayn Qantara, Dayr Abu sa'id, Dayr Alla, Ghawr Kated, Juffayn, Tabaqat Fahl, Tila' al Ali, Wadi al Arab, Wadi Shua'yb, Zabdah.

Collecting months. MAR (3), APR (12), MAY (1), JUN (1).

Remarks. The Desert Fritillary occurs in North Africa and the Levant. It is found in the Mediterranean zones of Jordan, the fringes of the Jordan Valley and southern desert into Saudi Arabia (Pittaway 1985). Its flight is much higher above the ground than that of other Jordanian *Melitaea*. Larvae feed on species of Scrophulariaceae. Three broods are probable, the second and the third are partial and irregular (Larsen & Nakamura 1983).

Satyrinae

Melanargia titea titania Calberla, 1891

Material. 387 specimens. *Localities.* Abu Nusayr, Afra, Ajlun, Al Jubayhah, Al-Karak, Al Mujib Nature Reserve, Al Muqabalayn, Al-Yazidiyah, Al Yadudah, Amman, Ar Rabad Castle, Ar Rajif, Ar Rumaymin, As Salt, As Salt, Az Zarqa, At Tafilah, Ayn Qantara, Amman, Birayn, Dana Reserve, Dibbin, Ghawr Kabid, Ibbin, Irbid, Jarash, Mahis, Mursi', Na'ur, Shafa Badran, Qwaylibah, Sakib, Ukaydir, Ar Rumman, Wadi al Arab, Wadi as Sir, Wadi Shu'ayb, Yajuz, Zeizia.

Collecting months. FEB (1), MAR (6), APR (76), MAY (268), JUN (15), JUL (0), AUG (17), SEP (0), OCT (3), NOV (1).

Remarks. The Palestine Marbled White occurs in the Levant. Larsen & Nakamura (1983) mentioned that it is limited in Jordan to the northern Mediterranean zone, but the record from At Tafila proves its occurrence in the southern Mediterranean zone also. Its peak activity appears to be in May as the above data suggest. A second brood is possible towards the end of the year. Larvae feed on grasses and adults are attracted to the flowers of *Carduus* and *Centaurea*.

Hipparchia fatua sichaea Lederer, 1857

Material. 6 specimens. *Localities.* Al Jubayhah, Ayn at Tannour, Irbid.

Collecting months. JUN (1), JUL (0), AUG (0), SEP (1), OCT (0), NOV (4).

Remarks. The Freyer's Grayling is a Ponto-mediterranean species, distributed from the Balkans

via the Middle East and Iran to Turkmenistan. A single brood occurs in June and July, while specimens collected later in the year are aestivating females who appear to oviposit at the onset of autumn. The food plants are grasses (Larsen & Nakamura 1983).

Pseudotargumia pisidice Klug, 1832

Material. 3 specimens. *Locality.* Al Mujib Nature Reserve, Wadi Shgeig.

Collecting month. JUL (3).

Remarks. The Sinai Grayling occurs in southern parts of Turkey, the Levant, Sinai, and as far south as Saudi Arabia (Pittaway, 1985). It was previously recorded from several localities in the northern Mediterranean zone only. The above localities represent the southernmost records in Jordan so far. It is possible that the species occurs in the southern Mediterranean zone as well. Larvae feed on grasses.

Pseudochazara telephassa Hubner, 1806

Material. 67 specimens. *Localities.* Al Jubayhah, Al Baq'ah, Al Karak, Al Mujib Nature Reserve, Amman, As Salt, Az Zarqa, Jarash, Shafa Badran, Suwaylih, Ar Rumman,

Collecting months. APR (1), MAY (25), JUN (25), JUL (15), AUG (1).

Remarks. The Telephassa Grayling is found in the Levant, Turkey, Iran and Afghanistan. It is the most common satyrid in Jordan occurring in both Mediterranean zones and eastern desert. Even though it was collected from June to August, Larsen & Nakamura (1983) mentioned records from October and they assumed a single protracted brood.

Maniola telmessia Zeller, 1847

Material. 62 specimens. *Localities.* Al Baq'ah, Al Jubayhah, Al Manshiyah Ar Rumaymin, As Salt, Ayn Qantara, Dayr Alla, Irbid, Jarash, Juffayn, Nahlah, Near Jarash, Suwaylih, Wadi al Arab, Wadi as Sir.

Collecting months. MAR (2), APR (20), MAY (26), JUN (3), JUL (1), AUG (9), SEP (1).

Remarks. The Eastern Meadow Brown is found in Turkey, Iran and the Levant. It is restricted to the northern Mediterranean zone. It has one brood in April and May. Specimens collected later in the year are aestivating individuals appearing to oviposit (Larsen & Nakamura 1983).

***Hyponephele lupinus centralis* Riley, 1921**

Material. 36 specimens. *Localities.* Al Jubayhah, Amman, As Salt, Jarash, Zayy.

Collecting months. MAY (4), JUN (26), JUL (5), AUG (1).

Remarks. The Oriental Meadow Brown occurs in North Africa, southern Europe, Asia Minor, the Levant, Iran, and Afghanistan. In Jordan, it appears to be limited to the northern Mediterranean zone. It has a single brood in May and June or July. Specimens collected in August or September are assumed to be aestivating individuals appearing to oviposit (Larsen & Nakamura, 1983). Larvae feed on grasses.

***Ypthima asterope* Klug, 1832**

Material. 52 specimens. *Localities.* Al Jubayhah, Al Mujib Nature Reserve, Ar Rumaymin, As Salt, Dayr Alla, Ghawr as Safi, Irbid, Kufrinijah, Madaba, Mahis, Ma'in, Marka, Nahlah, Tabaqat Fahl, Umm as Summaq, Wadi as Sir, Wadi Fayfa, Wadi Shu'ayb, Yajuz, Zayy.

Collecting months. MAR (3), APR (3), MAY (0), JUN (3), JUL (5), AUG (10), SEP (4), OCT (19), NOV (5).

Remarks. The African Ringlet is distributed in dry parts of tropical Africa, Arabia, and much of tropical Asia. It is common in the Mediterranean zones and the Jordan Valley. It appears to have many broods from March to November. Only one specimen is known from Al Azraq Reserve in the eastern desert (Amr et al. 1997).

***Lasiommata maera orientalis* Heyne, 1894**

Material. 12 specimens. *Localities.* Ar Rumaymin, As Salt, Jarash, Salalem As Salt, Tabarbawr.

Collecting months. APR (3), MAY (1), JUN (3), JUL (5).

Remarks. The Large Wall Brown occurs in North Africa, most of Europe, the Levant, the Middle east to the Himalayas. It was collected mainly in the northern Mediterranean zone from April to July, which may represent two broods, but Larsen & Nakamura (1983) expected a third late brood in September.

***Lasiommata megera emilyssa* Verity, 1919**

Material. 7 specimens. *Localities.* Ash Shawbak, Ayn Qantara, Ibbin, Kufrinijah, Sakib, Wadi al Haydan.

Collecting months. MAY (6), JUN (0), JUL (1).

Remarks. The Wall Brown is a Holo-mediterranean species. It was collected in the northern Mediterranean zone of Jordan, but also from Petra in the southern Mediterranean zone. It flies from February to August and probably to October (Larsen & Nakamura 1983).

Lycaenidae***Theclinae******Deudorix livia* Klug, 1834**

Material. 38 specimens. *Localities.* Al Jubayhah, Al Khirbah as Samra, Amman, Ar Rumaymin, Ar Rumman, As Salt, At Turrhah, Dayr Alla, Irbid, Nahlah, Near Jarash, Wadi Shu'ayb, Zayy.

Collecting months. JAN (1), FEB (0), MAR (0), APR (0), MAY (0), JUN (1), JUL (1), AUG (14), SEP (11), OCT (4), NOV (6).

Remarks. The Pomegranate Hairstreak (or Pomegranate Playboy) is distributed in the arid regions of Africa, the Arabian Peninsula, parts of the Middle East, and southwestern Iran. Previously collected from localities extending from Debbin in northern Jordan, as far as Aqaba in the south. It was collected from forested areas as well as from several localities in the Jordan Valley. It is quite common during August and September and declines towards December and then emerges again in early June. Larsen & Nakamura (1983) suggested a migratory status for this species, and indicated that autumn populations can persist. This is in agreement with the collecting dates of specimens taken from the Jordan Valley. *Deudorix livia* feeds on *Acacia farnesiana* and *Punica granatum*, where the former species is an introduced ornamental plant, commonly planted on roadsides in the Jordan Valley. Also, it feeds occasionally on olive flowers.

***Iolais glaucus* Butler, 1885**

Material. 1 specimen. *Locality.* Wadi As Salt.

Collecting month. OCT (1).

Remarks. The Arabian Sapphire is distributed throughout the Horn of African (Somalia and Ethiopia) and some parts of the Arabian Peninsula (Larsen 1983). It is associated with the striking flowers of *Loranthus* sp., a parasitic plant on *Acacia* trees.

*Aphnaeinae****Apharitis acamas acamas* Klug, 1834**

Material. 6 specimens. *Localities.* Al Jubayhah, Amman, Nahlah.

Collecting months. JUN (4), JUL (1), AUG (0), SEP (0), OCT (1).

Remarks. The Leopard Butterfly is an eremic species and several subspecies are recognized across the Sahara to India. Similar to the previous findings of Larsen & Nakamura (1983), it seems that the Leopard Butterfly occurs in northern Jordan from June to October while in the Jordan Valley, it can be found in December.

*Lycaeninae****Lycaena phlaeas timeus* Cramer, 1777**

Material. 46 specimens. *Localities.* Al Jubayhah, Amman, Ar Rumaymin, Al Aridah Road, As Simakiyah, Dayr Alla, Jarash, King Talal Dam, Kurayyimah, Nahlah, Tabaqat Fahl, Zabdah, Zayy.

Collecting months. FEB (1), MAR (6), APR (5), MAY (14), JUN (10), JUL (4), AUG (2), SEP (2), OCT (0), NOV (2).

Remarks. The Small Copper is found in the temperate Palaearctic region, Greenland and eastern North America. The subspecies *timeus* was collected from the Jordan Valley as well as from densely forested areas (Nahlah & Zayy). Apparently, it is a resident species and occurs throughout the months of the year, with high abundance in May and June. Larvae feed on the flowers of *Rumex* and *Polygonum*.

***Lycaena thersamon omphale* Klug, 1834**

Material. 261 specimens. *Localities.* Ajlun, Al Fuhays, Al Ghawr, Al Jubayhah, Al Khirbah as Samra, Amman, Ar Rumaymin, As Salt, Dayr Alla, Dhulayl, Dibbin, Jarash, Madaba, Nahlah, Suwaylih, Tila' al Ali, Umm ar Rumman, Umm as Summaq, Wadi Saqrah, Zayy.

Collecting months. MAR (2), APR (18), MAY (14), JUN (59), JUL (8), AUG (24), SEP (70), OCT (53), NOV (13).

Remarks. The Lesser Copper occurs from Italy and Austria to the Balkans, the Middle East and Afghanistan. Larsen & Nakamura (1983) discussed the subspecific forms of this species; *kurdistanica* and *omphale*, and concluded that the later is a valid subspecies for the Levant. It was collected from the

Mediterranean zones as well as from several localities within the Irano-Turanian zone. Collecting dates suggest two broods, one in April, followed by another in August. Adults prefer the flowers of *Eryngium creticum*, while larvae feed on *Rumex*, *Sarothamunus* and *Polygonum*.

*Polyommatinae****Lampides boeticus* Linnaeus, 1767**

Material. 55 specimens. *Localities.* Al Jubayhah, As Salt, Az Zarqa, Dead sea, Irbid, Jarash old road, Al Kirbah as Samrah, Zayy.

Collecting months. MAR (1), APR (4), MAY (2), JUN (6), JUL (9), AUG (7), SEP (14), OCT (12).

Remarks. The Long-tailed Blue is widely distributed in the Palearctic region from which it migrates into the Palaearctic region. It is found virtually in all types of habitats in Jordan. Collecting dates suggests that two broods emerge annually, one in May and June and another in September and October. Larsen (1974) stated that *L. boeticus* feeds on a wide range of legume species.

***Leptotes pirithous* Linnaeus, 1767**

Material. 61 specimens. *Localities.* Al Jubayhah, Az Zarqa', Ghawr Kabid.

Collecting months. JAN (5), FEB (0), MAR (0), APR (0), MAY (0), JUN (0), JUL (0), AUG (2), SEP (1), OCT (7), NOV (34), DEC (12).

Remarks. The Common Zebra Blue (or Lang's Short-tailed Blue) is an Afrotropical species that has succeeded in penetrating the Arabian Peninsula and southern Europe. It is common during early autumn to December in the Jordan Valley and disappears thereafter. Except for Al Jubayhah locality, the others are warm habitats. It was seen in large numbers in alfalfa fields in Gawr Kabid in the Jordan Valley.

***Tarucus rosaceus* Austaut, 1885**

Material. 5 specimens. *Localities.* Al Jubayhah, Iraq al Amir, Wadi as Sir, Wadi Shu'ayb.

Collecting months. MAR (1), APR (0), MAY (1), JUN (0), JUL (0), AUG (0), SEP (0), OCT (2), NOV (1).

Remarks. The Mediterranean Pierrot (or Mediterranean Tiger Blue) has a wide distribution, extending from North Africa to northwestern India. Localities indicated here are wadis with permanent water bodies that host a wide variety of wild flowers

all year round. The main food plant is *Ziziphus spina-christi*.

***Zizeeria karsandra karsandra* Moore, 1865**

Material. 11 specimens. *Localities.* AlJubayhah, Ghawr Kabid.

Collecting months. JUL (1), AUG (0), SEP (1), OCT (4), NOV (5).

Remarks. The Asian Grass Blue is found from Australasia, via India, to Oman, Iraq, Lebanon, Egypt, Libya and Tunisia. It is common in the Jordan Valley, however, it was found to be local within the Mediterranean zones (Larsen & Nakamura 1983). It feeds on several Fabaceae species.

***Azonus jesous* Guérin-Ménéville, 1849**

Material. 1 example. *Localities.* Dayr Alla, Khunayzir dam.

Collecting month. MAY (1).

Remarks. African Babul Blue is a migrant butterfly found in Africa, Arabia, Middle East and India. It is rather common in warm habitats with water courses. It was collected previously from several localities along the Jordan Valley as well as from Aqaba. But it is not expected to be a permanent resident in Jordan (Larsen & Nakamura 1983). The food plant is *Acacia* spp. but *Prosopis* is a possible host.

***Chilades galba* Lederer, 1855**

Material. 4 specimens. *Localities.* Al Baqurah, Dayr Alla, Jawa.

Collecting months. MAY (3), JUN (1).

Remarks. The Lederer's Cupid is an eremic species with a wide range of distribution. It is a migrant species common in the Jordan Valley and was found locally in the northern Mediterranean zone and eastern desert. The food plants are *Prosopis* and *Acacia*.

***Chilades trochylus* Freyer, 1845**

Material. 24 specimens. *Localities.* AlJubayhah, Amman, Irbid.

Collecting months. JUN (4), JUL (0), AUG (8), SEP (4), OCT (8).

Remarks. The Grass Jewel is found in Africa, the Middle East, the Balkans, Arabia, Iran, Afghanistan and north-western India. It was collected from several localities within all biogeographical regions of Jordan. Several broods are possible from April through October. Food consists of *Heliotropium* and

Indigofera.

***Plebejus pylaon cleopatra* Hemming, 1934**

Material. 56 specimens. *Localities.* Al Baqurah, Al Jubayhah, Al Khirbah as Samra, Amman, Ar Rumaymin, Ar Rumman, As Salt, Jarash, Jordan Valley, Mahis, Umm as Summaq.

Collecting months. MAR (1), APR (3), MAY (5), JUN (11), JUL (5), AUG (8), SEP (8), OCT (12), NOV (3).

Remarks. Three subspecies of the Zephyr Blue are known to occur in the Middle East. *Plebejus pylaon nichollae* Elwes 1901 in Lebanon, *Plebejus pylaon cleopatra* Hemming 1934 in southern Palestine, and *Plebejus pylaon philbyi* Graves 1925 originally described from Petra (Graves 1925; Hemming 1932; Larsen & Nakamura 1983). Larsen & Nakamura (1983) stated that two subspecies occur in Jordan; *P. p. cleopatra*, common in the transitional zone between the Mediterranean and the Irano-Turanian zones, and *P. p. philbyi* occurring in desert and arid habitats. Evidently, numbers of broods vary according to the biogeographical region; where as one brood appears in the spring in the Mediterranean zone, while two broods are laid in more warm and dry habitats. It feeds on *Astragalus* spp. (Fabaceae).

***Aricia agestis agestis* Denis & Schiffermuller, 1775**

Material. 13 specimens. *Localities.* Irbid, Qwaylibah.

Collecting months. JUN (1), JUL (0), AUG (2), SEP (9), OCT (1).

Remarks. The Brown Argus is found in Europe, the Levant and Iran. It appears to be a rare species in Jordan. It was collected previously from several localities within the northern Mediterranean zone of Jordan. The collecting dates suggest two broods, one in the spring and the second towards the end of the summer. It feeds on *Erodium* and *Helianthemum*.

***Polyommatus icarus zelleri* Verity, 1919**

Material. 150 specimens. *Localities.* Ajlun, Al Jubayhah, Al Khirbah as Samrah, Amman, Ar Rumaymin, Ar Rumman, As Salt, Dayr Alla, Irbid, Jarash Mahis, Na'ur, Near Aridah, Near Jarash, Ar Ramtha, Tila' al Ali, Umm as Summaq, Wadi Haydan, Yajuz, Zayy.

Collecting months. FEB (1), MAR (2), APR (20), MAY (16), JUN (22), JUL (17), AUG (27), SEP (21),

OCT (19), NOV (4), DEC (1).

Remarks. The Common Blue is common in North Africa, Europe, the Middle East and most of temperate Asia. It is the most common lycaenid in Jordan, inhabiting a wide range of habitats. It was collected from the northern and southern Mediterranean zones, Jordan Valley as well as desert habitats. Multiple broods are evident as the collecting dates indicate. These broods vary in number depending on the biogeographical zone. It was found to feed on *Lotus* and *Medicago*.

Hesperiidae

Pyrginae

Pyrgus melotis melotis Duponchel, 1834

Material. 7 specimens. *Localities.* Ar Rumaymin, Jarash, Jordan Valley, Nahlah.

Collecting months. APR (4), MAY (2), JUN (0), JUL (1).

Remarks. The Levantine Grizzled Skipper is found in the Levant and south-eastern Turkey. In Jordan, it is restricted to the northern Mediterranean zone, where it was previously collected from Debbin and Hammie. It prefers moist habitats such as small permanent springs bordered by *Rubus* (Larsen & Nakamura 1983). Apparently, one brood is deposited in the spring, while in Lebanon, Larsen (1974) indicated that two generations appear.

Spialia orbifer hilaris Staudinger, 1901

Material. (9) specimens. *Localities.* Al Jubayhah, Al Mujib Nature Reserve, Amman, Ar Rumaymin, Jarash, Madaba.

Collecting months. MAR (1), APR (2), MAY (3), JUN (1), JUL (1), AUG (0), SEP (1).

Remarks. The Orbiferous Skipper occurs in a series of subspecies in Yugoslavia, the Middle East, Russia, western China and Korea. In Jordan, it is confined to the northern Mediterranean zone. Larsen & Nakamura (1983) stated that two broods are produced, one in early April and the second in July. The food plant in Jordan is not known.

Syrichthus tessellum nomas Lederer, 1855

Material. 1 example. *Locality.* Jarash.

Collecting month. APR (1).

Remarks. The Tessellated Skipper can be found

from the Balkans via the Middle East to Central Asia. The subspecies *nomus* is rare in Jordan. So far, with this record, only 11 specimens were ever collected from Jordan, however, it is quite common in Palestine and Lebanon (Larsen & Nakamura 1983). Collected previously from Jarash, Ajlun and Wadi Zarka, from various types of habitats including olive groves. Most probably larvae feed on *Phlomis* spp.

Syrichthus proto hieromax Hemming, 1932

Material. 2 specimens. *Localities.* Al Jubayhah, Saad al kaldeyyah.

Collecting month. OCT (2).

Remarks. The Large Grizzled Skipper is a Mediterranean butterfly found in North Africa, Iberian Peninsula, Turkey and the Levant. The subspecies *hieromax* was originally described from Ajlun, Jordan (Hemming 1932), and seems to be localized in Jordan, Palestine and the coastal region of Lebanon. Larsen & Nakamura (1983) discussed the status of the two subspecies; *Syrichthus proto hieromax* is found in the coastal areas of Lebanon and it is rare in both Jordan and Palestine, and *Syrichthus proto lycaonius* is distributed in the Lebanese mountains. Larsen & Nakamura (1983) expected *Phlomis* spp. as hosts.

Carcharodus alceae Esper, 1780

Material. 72 specimens. *Localities.* Al Aridah, Al Jubayhah, Al Mushaqqar, Ar Rumaymin, As Salt, Dayr Alla, Ghawr as Aafi, Irbid, Jarash, Near Ghawr Kabid, Wadi Shu'ayb, Zayy.

Collecting months. FEB (1), MAR (2), APR (5), MAY (2), JUN (4), JUL (5), AUG (10), SEP (21), OCT (17), NOV (5).

Remarks. The Hollyhock Skipper (or the Mallow Skipper) is found in most of Europe, the Middle East, Afghanistan and north-western India. It is a common species in Jordan found almost all year round. Localities reported here are within the northern Mediterranean zone and the Jordan Valley. Also, collecting dates suggests that two broods are produced annually, one in early spring followed by one at the end of summer. The food plants are *Malva* and *Althaea*.

Carcharodus stauderi ambigua Verity, 1925

Material. 7 specimens. *Localities.* Al Fuhays, Al Jubayhah, Ar Rumaymin, Jarash, Ar Rumman.

Collecting months. APR (5), MAY (2).

Remarks. The North African Skipper is found in a series of subspecies from Morocco to the Levant, Asia Minor and western Iran. It was collected from several localities within the northern Mediterranean zone of Jordan, fringes of the eastern desert and the Jordan Valley. Specimens were collected during April and May, similar to findings indicated by (Larsen & Nakamura 1983).

Hesperinae

Thymelicus lineola fornax Hemming, 1934

Material. 89 specimens. *Localities.* Al Aridah Road, Al Jubayhah, Al Mushaqqar, Ar Rumaymin, As Salt, Dayr abu Sa'id, Irbid, Jarash, Juffayn, Kafr Yuba, Na'ur, Wadi al Arab, Wadi al Yabis, Zabdah.

Collecting months. MAR (17), APR (27), MAY (41), JUN (2), JUL (0), AUG (2).

Remarks. The Lulworth Skipper occurs in North Africa, Europe, Middle East and Central Asia. In Jordan, it is a common species, inhabiting both the Jordan Valley and the northern and southern Mediterranean zones. Peak collecting was in May. Specimens were reported further south as far as Petra. The food plants are grasses, especially the genera *Triticum* and *Arrhenatherum*.

Gegenes gambica Mabille, 1878

Material. 30 specimens. *Localities.* Al Jubayhah, Al Mujib Nature Reserve, Ar Rumaymin, Ghawr Kabid, Hammamat Ma'en-Madaba, Irbid, Mujib Nature Reserve, Umm Qays.

Collecting months. MAR (1), APR (2), MAY (5), JUN (0), JUL (0), AUG (1), SEP (20), OCT (1).

Remarks. The Pigmy Skipper is an eastern Mediterranean butterfly. It was collected from several localities ranging from the Jordan Valley to the east in Zarka (Larsen & Nakamura 1983). Collecting dates suggest that the Pigmy Skipper have two broods, one in the spring and the other towards the end of the summer, with peak activity in September. Larvae feed on grasses.

Pelopidas thrax thrax Hübner, 1821

Material. 4 specimens. *Localities.* Hammamat Ma'en-Madaba, Near the Dead Sea.

Collecting months. MAY (2), JUN (0), JUL (1), AUG (1).

Remarks. The Millet Skipper occurs in Arabia, Egypt and the Middle East. It was previously

collected from the Jordan Valley as well as from northern Mediterranean zone mostly in September and November. It appears that the Millet Skipper is not common in Jordan. Larsen (1974) reported on the migratory behavior of this species in Lebanon, and perhaps its scarce population in Jordan represents migrants. Larvae are minor pest of rice in Iraq (Al Hussein 1984).

DISCUSSION

A total of 65 species of butterflies are recorded from the different ecological zones in Jordan. With the two additional records, the total number of Jordanian butterflies is now 91 species and subspecies (Table 1). Composition wise, the butterflies of Jordan belong to five families. Family Lycaenidae includes the highest number of species (26 species and subspecies), the Pieridae (24 species and subspecies), the Nymphalidae (22 species), the Hesperidae (14 species), while the Papilionidae includes the least number (5 species).

Larsen (1987) analyzed the origin of the butterfly fauna of Jordan and the neighboring countries, where as 62%, 18% and 20% are of Palaearctic, Eremic and Tropical origins, respectively. However, Benyamini (1988) considered *Madais fausta*, *Zizeeria karsandra* and *Limenitis reducta* as oriental elements. No endemic species or subspecies are found in Jordan, since all originally described ones from Jordan were found later in nearby areas.

Since Jordan is mostly considered an arid country, where the Eastern Desert comprises up to 70% of the total area, 20 species (about one fourth of the total butterflies species) are migrants (Larsen & Nakamura 1983). Some of these migrants include; *Danaus chrysippus*, *Catopsilia florella*, *Euchloe ausonia*, *Madais fausta*, and *Junonia orithya*. Further analysis is required based on the current status of the existing butterflies.

After examining more than 3350 specimens of butterflies, and despite the continuous collecting over the past 7 years, we report 65 species, which is far less than the records given by Larsen & Nakamura (1983). Indeed, for the past three decades, the natural environment of Jordan has gone through extensive changes in the form of irrigated agriculture and urbanization due to population increase, where both activities resulted

in loss of natural habitats. Also, along with the expanding agriculture, uncontrolled misuse of pesticides certainly affected the insect fauna of Jordan, including butterflies. Livestock grazing, the use of wood for fuel, the accidental or deliberate burning of forest had also negative impact on the flora. For example, comparing the vegetation in Ash Shoumari Reserve in the Eastern Desert, Dibbin National Park in the northern Mediterranean zone and the vegetation in many mine fields along the borders in the Jordan Valley to the areas around them, clearly shows that grazing alone makes a great reduction in vegetation.

However, the absence of the unrecorded species does not necessarily indicate their extension. Some species are rare and have been recorded previously once or twice from one or two locations. For example, *Melitaea perseia sargon* was recorded from one specimen from Wadi Rajil. *Zegris eupheme tigris* was recorded from one specimen collected in Wadi Rum. *Catopsilia florella*, a migrant species found in tropical Africa, was recorded only twice in 50 years. *Iolana alferii* was also reported from one specimen collected in Petra. *Chazara persephone*, a Levantine species, was recorded once from the fringes of the eastern desert of Jordan in 1927. Other species are extremely local in distribution and occupy unique habitats which make them difficult to collect. For example, *Tomares nesimachus*, a Levantine species, is associated with a special type of soil on which the food plant, *Astragalus macrocarpus*, grows (Larsen & Nakamura 1983). *Papilio saharae* is found in the remote southern desert and its hill-topping behavior makes it hard to capture. Fabiano (1998) found that rainfall scarcity and irregularity heavily affected the amount of flying species as well as the quantity of individuals. The number of species recorded from the southern desert varied according to the rainfall from 13 in 1992 to a minimum of 7 in 1993 and up to 30 in the relatively wet spring in 1994, to fall again to 13 in 1995 and 8 in 1996. This may be the case also in other parts of Jordan especially in the eastern desert and in the Irano-Turanian zones.

Eight species of butterflies are considered rare in Jordan: *Anthocharis gruneri*, *Charaxes jasius*, *Limenitis reducta*, *Melitaea arduinna*, *Melitaea perseia*, *Chazara persephone*, *Tomares nesimachus* and *Aricia agestis*. The rare butterflies indicate areas that need to be subject of habitat conservation. According to the IUCN Red Data Book (Collins et al. 1985)

Papilio alexanor and *Archon apollinus* are locally and globally threatened. Further evaluation of the status of local species is urgently needed. The protection of such species must be a priority for nature conservationists. The public attention should be attracted to the importance of butterflies as a national heritage that must be protected by all means. Collecting butterflies should be restricted to only very common or pest species. Future research may be directed toward the assessment of the current distribution of the local butterflies, their association with the local plants as well as to identify the major threats.

Larsen & Nakamura (1983) has already mentioned that the tropical oases of the southern part of the Dead Sea area should have high priority for conservation. The vegetation of these oases is almost wholly tropical with a total of more than 40 species not found elsewhere in Jordan. This area has important butterflies hosts like *Cassia obovata*, *Zizyphus spina-christi*, *Moringa aptera*, *Salvadora persica* (food plant of *Colotis phisadia*) and *Calotropis procera* (main food plant of *Danaus chrysippus*). Since the Mediterranean zone is the absolute southern distribution limit for many Mediterranean species, we agree with Larsen & Nakamura (1983) who endorsed a suggestion by early workers that the forest of Wadi Al Hisha in this zone should be made a conservation area. Most of *Allancastris deyrollei*, *Archon apollinus*, *Melitaea phoebe*, *Lasiommata megera*, *Carcharodus orientalis*, *Thymelicus flava* and *Thymelicus lineola* reach Petra but are localized to a few good collecting spots where perennial water is available.

The recent peace treaties in the area has encouraged the establishment of many tourism projects and the constructing of several roads like Al Ardani Road on the eastern bank of the River Jordan and the road at eastern side of the Dead Sea. This may have negative impact on ecology of butterflies in these areas. However, in the first area, the Higher Counsel of science and Technology sponsored a research program in order to study the biodiversity of the concerned area among several others in order no lessen the negative impact on the biodiversity of the area. Recently, the Royal Society for the Conservation of Nature (RSCN) has established the Mujib Nature Reserve on the eastern side of the Dead Sea which is expected to play a major role in the preservation of many butterfly species in the area. Also in the Southern Desert,

the RSCN has initiated several studies on the fauna of Wadi Rum area including insects, which will help in making a managing plan which will protect the already poor natural habitats of the Wadi, but harbors interesting butterflies like *Zigris eupheme* and *Papilio saharae*.

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Table 1. List of the Butterflies of Jordan. Species marked with (*) are recorded in this study.

Family Papilionidae

Subfamily Papilioninae

1. *Papilio machaon syriacus** Verity, 1905
2. *Papilio saharae* Oberthür, 1879
3. *Papilio alexanor maccabaeus** Staudinger, 1891

Subfamily Zerynthiinae

4. *Athacastris deyrollei eisneri** Bernardi, 1971

Subfamily Parnassiinae

5. *Archon apollinus** Herbst, 1798

Family Pieridae

Subfamily Pierinae

6. *Aporia crataegi augustior** Graves, 1925
7. *Pieris napi dubiosa* Röber, 1907
8. *Pieris brassicae** Linnaeus, 1758
9. *Pieris rapae leucosoma** Schawerda, 1905
10. *Pontia edusa** Fabricius, 1777
11. *Pontia glauconome glauconome** Klug, 1829
12. *Madais fausta fausta** Olivier, 1804
13. *Colotis phisadia phisadia** Godart, 1819
14. *Colotis danae eupompe** Klug 1829. **New record**
15. *Colotis chrysonome chrysonome* Klug, 1829
16. *Belenois aurota aurota** Fabricius, 1793
17. *Euchloe ausonia melisander** Fruhstorfer, 1908
18. *Euchloe crameri aegyptiaca* Verity, 1911
19. *Euchloe belemia** Esper, 1799
20. *Euchloe falloui* Allard, 1867
21. *Euchloe charlonia** Donzel, 1842
22. *Zegris eupheme uarda** Hemming, 1929
23. *Zegris eupheme tigris* Riley, 1921
24. *Zegris eupheme larseni* Pittaway, 1985
25. *Anthocharis gruneri gruneri** Herrich-Schäffer, 1851.

New record

26. *Anthocharis cardamines phoenissa* von Kalchberg, 1894

Subfamily Coliadinae

27. *Catopsilia florella* Fabricius, 1775
28. *Cotias crocea crocea** Geoffroy, 1785
29. *Gonepteryx cleopatra tauranica** Staudinger, 1881

Family Nymphalidae

Subfamily Danainae

30. *Danaus chrysippus chrysippus** L. 1758

Subfamily Charaxinae

31. *Charaxes jasius jasius** Linnaeus, 1767

Subfamily Nymphalinae

32. *Junonia orithya her** Lang, 1884
33. *Limnitis reducta schiffmuelleri** Higgins, 1933
34. *Vanessa atalanta** L. 1758
35. *Vanessa cardui cardui** L. 1758
36. *Polygonia egea** Cramer, 1775
37. *Melitaea phoebe telona** Fruhstorfer, 1908
38. *Melitaea arduinna evanescens** Staudinger, 1886
39. *Melitaea trivia syriaca** Rebel, 1905
40. *Melitaea perseae sargon* Hemming, 1932
41. *Melitaea deserticola macromaculata** Belter, 1934

Subfamily Satyrinae

42. *Melanargia titea titania** Calberla, 1891
43. *Hipparchia fatua sichaea** Lederer, 1857
44. *Pseudotargumia pisidica** Klug 1832

45. *Chazara persephone transiens* Zerny, 1932
46. *Pseudochazara telephassa** Hubner, 1806
47. *Maniola tehmessia** Zeller, 1847
48. *Hyponephele lupinus centralis** Riley, 1921
49. *Ypthima asterope** Klug, 1832
50. *Lasionmata maera orientalis* Heyne, 1894
51. *Lasionmata megera emilyssa** Varity, 1919

Family Lycaenidae

Subfamily Theclinae

52. *Deudorix livia** Klug, 1834
53. *Iolau glaucus** Butler, 1885
54. *Tomares nesimachus* Oberthür, 1893

Subfamily Aphnaeinae

55. *Apharitis acamas acamas** Klug, 1834
56. *Apharitis myrmecophila* Dumont, 1922

Subfamily Lycaeninae

57. *Lycaena phlaeas timeus** Cramer, 1777
58. *Lycaena thersamon omphale** Klug, 1834

Subfamily Polymmatinae

59. *Anthene amarah amarah* Guerin-Meneville, 1847
60. *Lampides boeticus** L. 1767
61. *Leptotes pirithous** L. 1767
62. *Tarucus balkanicus* Freyer, 1845
63. *Tarucus rosaceus** Austaut, 1885
64. *Zizeeria karsandra karsandra** Moore, 1865
65. *Azanus jesus** Guerin-Meneville, 1849
66. *Azanus ubaldus* Cramer, 1782
67. *Pseudophilotes vicrama astabene* Hemming, 1932
68. *Pseudophilotes abencerragus nabataeus* Graves, 1925
69. *Iolana alfieri* Wiltshire, 1948
70. *Chilades galba** Lederer, 1855
71. *Chilades trochylus** Freyer, 1845
72. *Plebejus pylaon nichollae* Elwes, 1901
73. *Plebejus pylaon cleopatra** Hemming, 1934
74. *Plebejus pylaon philbyi* Graves, 1925
75. *Aricia agestis agestis** Denis & Schiffermuller, 1775
76. *Polyommatus icarus zelleri** Verity, 1919
77. *Polyommatus loewii uranicola* Walker, 1870

Family Hesperidae

Subfamily Pyrginae

78. *Pyrgus melotis** Duponchel, 1834
79. *Spialia orbifer hilaris** Staudinger, 1901
80. *Spialia doris doris* Walker, 1870
81. *Syrictus tessellum nomas** Lederer, 1855
82. *Syrictus proto hieromax* Hemming, 1932
83. *Carcharodus alceae** Esper, 1780
84. *Carcharodus stauderi ambigua** Verity, 1925
85. *Carcharodus orientalis maccabaeus* Hemming, 1925

Subfamily Hesperinae

86. *Thymelicus acteon phoenix* Graves, 1925
87. *Thymelicus flava syriaca* Tutt, 1905
88. *Thymelicus lineola fornax** Hemming, 1934
89. *Gegenes nostrodamus* F., 1793
90. *Gegenes gambica** Mabilie, 1878
91. *Pelopidas thrax thrax** Hübner, 1821